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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/544,216	08/01/2005	Johan Hendrik Klootwijk	NL03 0089 US	9481
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NXP, B.V. NXP INTELLECTUAL PROPERTY DEPARTMENT M/S41-SJ 1109 MCKAY DRIVE SAN JOSE, CA 95131			EXAMINER NADAV, ORI	
			ART UNIT 2811	PAPER NUMBER
			NOTIFICATION DATE 04/11/2008	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/544,216	<b>Applicant(s)</b> KLOOTWIJK, JOHAN HENDRIK	
	<b>Examiner</b> Ori Nadav	<b>Art Unit</b> 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 25 January 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) 6-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 3 and 4 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The disclosure and the drawings describe three embodiments: the embodiments of figures 1, 2 and 6, respectively. Independent claim 1 reads on the embodiment of figure 6. The additional claimed limitations recited in dependent claims 3 and 4 read on the embodiments of figures 1 and 2. There is no support for a device comprising the limitations recited in claims 1, 3 and 4. Since the embodiment of figure 6 is examined, claims 3 and 4 should be withdrawn from consideration as being related to a different embodiment.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 is rendered indefinite because it fails to further limit the trench isolation structure, recited in claim 1.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiura et al. (6,150,686).

Regarding claim 1, Sugiura et al. teach in figure 1 and related text trench structure, comprising:

a slab of semiconducting material 11 having a surface and a buried layer 18 which extends parallel to the surface, the buried layer having an upper surface and a lower surface; and

a trench groove extending at least from the surface through the buried layer down to a part of the slab below the buried layer and

the trench groove including a liner 13, 14 of a first insulating material on a wall of the trench groove, and

wherein a remaining part of the trench groove is at least partially filled with a first filler material 15, and wherein the liner, in at least a first part of the trench groove that is substantially in line with the upper and lower surfaces of the buried layer, has a thickness 14 that is larger than a thickness of the liner 13 in a second part of the trench groove, the second part of the trench groove located below the first part.

Sugiura et al. do not teach using the trench structure as trench isolation structure.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use Sugiura et al.'s trench structure as trench isolation structure, in order to use the device in an application which requires trench isolation structure.

Note that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Note further that a preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hira*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Regarding claims 2, 4 and 5, Sugiura et al. teach in figure 1 and related text a thickness of the liner in the first part of the trench groove is larger than a thickness (zero thickness) of the liner in a third part of the trench groove, the third part of the trench groove located above the first part of the trench groove,

the first part of the trench groove extends substantially in line with the buried layer, and

a semiconductor assembly, comprising a trench isolation structure according to claim 1, and at least one semiconductor device present on the surface of the slab of semiconducting material, wherein the semiconductor device is insulated by means of the trench isolation structure.

Regarding claim 3, Sugiura et al. teach a first part of the trench groove (the thick part of layer 14) is completely filled with the first insulating material.

### ***Response to Arguments***

Applicant argues that there is support for a device comprising the limitations recited in claims 1, 3 and 4, because “claim 1 is a generic claim that covers more than simply the embodiment of figure 6”.

Applicant did not provide any evidence that independent claim 1 reads on the embodiments of figures 1 and 2. Applicant is respectfully requested to point out which elements in figures 1 and 2 read on the limitations “a remaining part of the trench

groove is at least partially filled with a first filler material, and wherein the liner, in at least a first part of the trench groove that is substantially in line with the upper and lower surfaces of the buried layer has a thickness that is larger than a thickness of the liner in a second part of the trench groove, the second part of the trench groove located below the first part", as recited in claim 1.

Applicant argues that claim 5 does not fail to further limit the structure of claim 1, because "claim 5 contains aspects which further limit claim 1 including, for example, at least one semiconductor device present on the surface of the slab of semiconducting material".

The claimed limitation of "at least one semiconductor device present on the surface of the slab of semiconducting material" does not further limit the structure of claim 1, because said at least one semiconductor device is not part of the claimed trench isolation structure.

Applicant argues in the response filed on 4/18/2007 that the rejection of claims 1 and 6 does correspond to all the claimed limitations, because "The Examiner asserts that "(i)t would have been obvious that the trench (see trench 12 in Figure 1 of Sugiura) provides an isolation function, because current will not flow through the insulating trench sidewall material.", and this assertion is incorrect.

The examiner did not state in the rejection mailed on 10/25/2007 that "(i)t would have been obvious that the trench (see trench 12 in Figure 1 of Sugiura) provides an

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isolation function, because current will not flow through the insulating trench sidewall material". The rejection states that "It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use Sugiura et al.'s trench structure as trench isolation structure, in order to use the device in an application which requires trench isolation structure. Note that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. Note further that a preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hiraio*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951)".

Applicant argues that Sugiura et al. do not teach a liner, in at least a first part of the trench groove that is substantially in line with the upper and lower surfaces of the buried layer, has a thickness that is larger than a thickness of the liner in a second part of the trench groove, as claimed.

Sugiura et al. teach a liner, in at least a first part of the trench groove that is substantially in line with the upper and lower surfaces of the buried layer, has a thickness that is larger than a thickness of the liner in a second part of the trench



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groove, as claimed, because the liner has a thickness 14 that is larger than a thickness of the liner 13 in a second part of the trench groove, in at least a first part of the trench groove. Said first part of the trench groove is substantially in line with the upper and lower surfaces of the buried layer, because it is located in the same line as the line of the upper and lower surfaces of the buried layer.

Note that the broad recitation of the claim does not require the liner to have a thickness that is larger than a thickness of the liner in a second part of the trench groove along the entire length the buried layer between the upper and lower surfaces of the buried layer.

Applicant argues that Sugiura et al. do not teach a thickness of the liner in the first part of the trench groove is larger than a thickness of the liner in a third part of the trench groove, wherein the third part of the trench groove located above the first part of the trench groove, because Sugiura et al. do not teach “first insulating material in the third part of the trench groove”, as required by claim 2.

Claim 2 does not require a “first insulating material in the third part of the trench groove”. Claim 2 merely states “a thickness of the liner in the first part of the trench groove is larger than a thickness of the liner in a third part of the trench groove, the third part of the trench groove located above the first part of the trench groove”. Clearly, Sugiura et al. teach a thickness of the liner in the first part of the trench groove is larger than a thickness (zero thickness) of the liner in a third part of the trench groove, wherein

the third part of the trench groove located above the first part of the trench groove, as claimed.

Applicant argues that Sugiura et al. do not teach “a first part of the trench groove is completely filled with the first insulating material”, as recited in claim 3, because the first part is “the part of trench 12 that separates n-buried layer 18”, “See e.g. Figures 1 and 2”.

There is no required in the claims that the first part must be the part of trench that separates n-buried layer. Therefore, Sugiura et al. teach a first part of the trench groove (the thick part of layer 14) is completely filled with the first insulating material, as claimed. Note further that figures 1 and 2 do not read on the claimed invention.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ori Nadav whose telephone number is 571-272-1660. The examiner can normally be reached between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Gurley can be reached on 571-272-4670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

O.N.  
4/9/2008

/ORI NADAV/  
PRIMARY EXAMINER  
TECHNOLOGY CENTER 2800